Does Confidentiality Affect Tax Compliance?

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Confidentiality of individual taxpayer data is a long-held basic right of the U.S. system of tax administration. Section 6103 of the Internal Revenue Code sets the guidelines for confidentiality and for the limited disclosure of return information to State and local tax officials. As noted by former IRS Commissioner Richardson, "IRS employees are prohibited from accessing information not needed to perform their official tax administration duties" (Testimony, April 15, 1997). Confidentiality of taxpayer data is thereby guaranteed within the system of tax administration, and the IRS imposes strict disclosure rules for individual taxpayer data for data flowing outside the Federal system to State tax administrators, other U.S. Government agencies, individuals, companies, etc., as well as penalties for unwarranted disclosure.

While many taxpayers believe that their tax information is largely private and held in confidence as stated by the IRS, the confidentiality of taxpayer data and information has not always been a given nor is it always chosen. Until the mid-1970's, tax returns of publicly traded companies were available to the public at large. Individuals may choose to disclose their tax information, and many in political office make this choice. State governments may have their own rules and regulations pertaining to disclosure of tax information. For example, the revenue code of Georgia allows limited disclosure in certain cases of tax arrears (see detail: http://www.etax.dor.ga.gov/DeT/DebtInterior.shtml). In West Virginia, disclosure of corporate income tax returns is closely held until disputes in liabilities reach the point of the circuit court, at which time, there is more openness of the tax returns.

Confidentiality or privacy of individual information may be compromised in a number of ways. With the continuing use of electronic information, there is always concern regarding the potential disclosure of information.[1] There may also be concern over "administrative disclosure" in the form of possible leakages of information by individuals who examine returns in Federal and state government or who otherwise have access to tax return data. Some states have purposefully disclosed some information on delinquent taxpayers to elicit taxpayer responses in the form of past-due payments. Overall, con-

cerns of privacy of information may affect taxpayers' perceptions of confidentiality of their personal information. This paper asks whether perceived breaches in confidentiality or a weakening in the ability to keep taxpayer data confidential can affect taxpayer compliance.

We use experimental methods to analyze how tax compliance responds to changes in the level of confidentiality of taxpayer information. While there is a substantial literature on taxpayer compliance (including a number of studies using experimental methods), we have not found any empirical research on the impact of confidentiality and compliance. In our study, in various trials, data on tax reporting is either held confidential or is seen by a random number of other participants. We empirically test for an impact of the breach of confidentiality on the tax reporting decision in the experimental laboratory, as detailed below. The experiments and the results are preliminary but are suggestive of an impact of confidentiality on compliance. We believe that the experimental methodology used in this paper may be refined to shed some light on the issue of confidentiality as it relates to tax compliance, in an age when people are growing ever more concerned about their privacy.

The paper proceeds as follows. In the next section, we provide a motivation for the confidentiality/compliance link, appealing to a basic model of tax compliance. The third section provides detail on the experiments that we run, and the fourth section provides the preliminary results. We conclude with suggestions for further experimental research.

The Confidentiality-Compliance Link

What role does confidentiality play in the taxpayers' perceptions of the tax system? There are several arguments that could be put forth. For example, perhaps taxpayers do not think much about confidentiality. To date, we have not found a survey or other documented evidence regarding whether or not individual taxpayers know or think much about the confidentiality of their data. On the other hand, if taxpayers do feel that they have a commitment from the IRS to keep their data private (as stated in various IRS publications and documents), breaches of confidentiality might affect a "social contract" between taxpayers and the tax administration. There is reason to believe that taxpayers expect some level of confidentiality. Therefore, actual or perceived breaches of confidentiality may lead taxpayers to feel that the IRS has not kept up its end of the bargain, and, in turn, they reduce their compliance with the tax system.[2] Reduced compliance could range from less than full disclosure on total income to more liberal "interpretations" and reporting of deductions, to outright failure to file tax returns or seeking "underground" employment.[3]

Breaches of confidentiality could affect compliance in the opposite way as well. If an individual believes that the IRS will release his or her information in some way, he or she may increase compliance with the system in order to prevent embarrassment associated with public disclosure of noncompliance. Or, with reduced confidentiality, taxpayers might believe they are more likely to be caught for underreporting and therefore increase compliance. In all of these cases, the current or baseline understanding of confidentiality could influence current compliance, and changes to that belief could increase or decrease future compliance.

Model of Taxpayer Compliance and Confidentiality

While the purpose of this paper is largely empirical, it is useful to put the confidentiality-compliance issue into a theoretical context. Much of the tax compliance literature finds its theoretical basis in the model of Allingham and Sandmo (1972), in which taxpayers are assumed to maximize expected utility of net income EU(I), with a choice over how much income (D) to report to tax authorities, given a particular penalty rate, f, on undeclared income and a given tax rate, t. The probability of detection is p; so, the expected utility is:

$$EU(I) = pU(I_c) + (1-p)\ U(I_N)$$

where I_c is the net income in the case of detected underreporting of income and I_N is net income in the case of undetected underreporting of income. As summarized by Alm (1991), the comparative statics of this model suggest that increases in the penalty rate or the probability of detection increase the level of declared income. Increases in the tax rate have an ambiguous effect on the level of reporting. A number of the predictions of this theoretical model have not been borne out in the empirical literatures. For example, researchers have found much higher levels of compliance than predicted by the model. As noted in Alm (1991), the basic expected utility model may be more insightful with respect to changes in reporting for changes in the parameters such as tax rates and penalties, but it does a relatively poor job of predicting absolute behavior.

Some of the shortcomings of the traditional expected utility model are attributed to an inability to model certain other conditions, such as the social aspects of paying taxes, notions of civic duty, or the framing of compliance issues at any point in time. While these factors may be controlled for empirically, they have not been carefully integrated into a theoretical model. The development of a new theoretical model of compliance is not the focus of the

current paper, but the issue of confidentiality and compliance falls squarely in this gray area of the current theory. Experimental methods have been seen as one methodology that can help control for some of the real life complexities. However, experiments themselves have a number of limitations, and our study is not immune to some of those problems.

If we were to use the expected utility model to theoretically analyze the behaviors of taxpayers facing changes in the level of confidentiality, we could possibly incorporate two states of the world—one with confidentiality of data and one without. In the "without" world, the expected utility may be defined by reported income as above, but also by a loss of stature (via a loss of income) if confidentiality were not upheld and underreporting of income were made known to the public. The peer effect of "if he doesn't pay, I won't pay" is admittedly difficult to incorporate into the standard expected utility model.

There are some less traditional models of behavior, which have direct applications in the area of tax compliance. These will be explored in future research, but we summarize them here. The area of prospect theory may be fertile ground for theoretical analysis of tax compliance, especially in cases where individual characteristics and perceptions are important in the decisionmaking process. Prospect theory treats the "framing" of a problem as an important step in decisionmaking behavior. The theoretical look at a decision thus become highly individualized and is less general than the neo-classical model using expected utility. Reckers et al. (1994) add tax ethics to the mix of factors that affect tax compliance, but do so from an empirical standpoint and not based on a theoretical model.

If the theoretical underpinnings of this paper were taken from the expected utility model, confidentiality could affect compliance via a number of avenues. If we integrated prospect theory, we might more carefully consider the frames of reference of the individuals—have they been audited in the past? Have they recently been unemployed?, etc. We could also analyze the level of tax morality and its effect on the compliance decision in this analysis. In the end, we find that changes in the confidentiality of taxpayer information could increase or decrease tax compliance. We turn to an experimental design to shed some light on the likelihood of taxpayer responses to changes in confidentiality of taxpayer data.

Experimental Design

The experimental design follows that used by Cummings, Martinez-Vazquez, and McKee (2001) and mimics the basic tax reporting decision faced by most individuals. At the beginning of a decisionmaking round, an individual is given income and then must decide how much of this income to report to the ex-

perimenter. Income that is reported is taxed at the preannounced rate; if income is not reported, it is not taxed unless the subject is audited (in which case a penalty is paid on any unreported income). Therefore, in a given period, the subject's earnings depend on his or her reported income, the tax rate, and whether he or she is audited. If an individual is not audited, his or her earnings are calculated as:

$$Earnings_{NA} = I_A - \left(t \times I_R\right)$$

where I_A is actual income, t is the tax rate, and I_R is reported income. In other words, one earns his or her income less any taxes paid on his or her reported income. If an individual is audited, his or her earnings are calculated as:

$$Earnings_A = I_A - \left(t \times I_R\right) - Penalty$$

where:

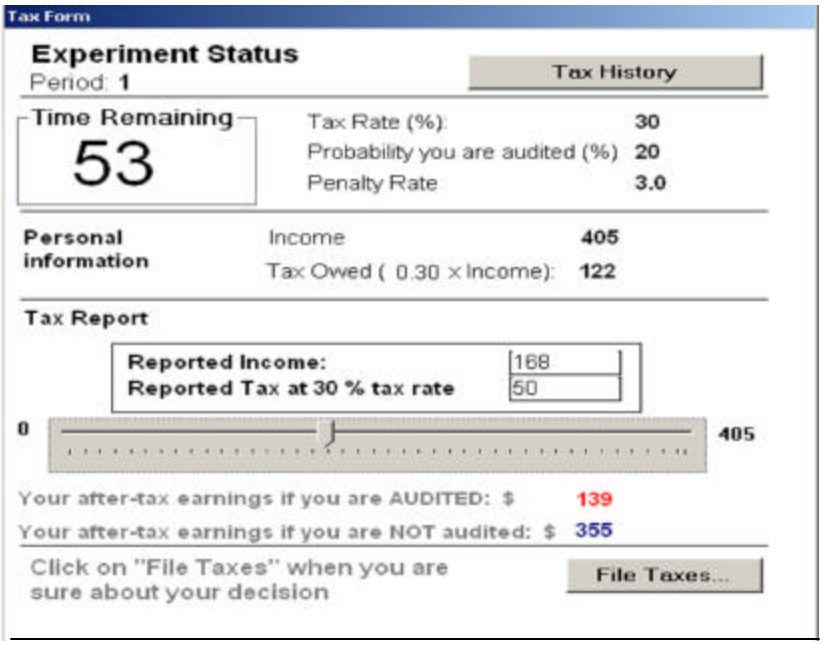
$$Penalty = pen \times t \times \left(I_A - I_R\right)$$

and *pen* is the penalty rate. For example, if *pen* = 2, then the penalty is twice the taxes owed on any unreported income. Of course, if one reports his or her income fully ($I_R = I_A$), then there is no penalty if he or she is audited.

Before choosing how much income to report, each subject is told: his or her income, the tax rate, the probability of being audited, and the penalty rate if one is audited. Figure 1 shows a sample decision screen. In this example, the subject's income in the period is 405, the tax rate is 30 percent, the probability of being audited is 20 percent, and the penalty is 3 times the taxes owed. This is certainly rich information relative to the naturally-occurring situation. Outside of the lab, one may have an idea of the penalty-rate, but it is unlikely that one has a precise idea of the probability of being audited.[4] We use this simplification in order to better focus on our treatment of interest and confidentiality, without possible confounding effects from uncertainty associated with audit probabilities or other variables.

In order to ensure that subjects understand the implications of one's decision, the decision screen also displays the earnings (if audited or if not audited) for any possible level of income reported. For example, in the sample decision screen shown in Figure 1, the subject has currently chosen to report \$168 (out of his income of \$405). At a 30-percent tax rate, this subject owes \$50.40 (rounded to \$50). If the subject is not audited, the subject would earn \$405 - \$50 = \$355. This is shown to the subject in the line "Your after-tax earnings if you are NOT audited." The line above this shows the subject's after-tax earnings if he is audited. As the subject slides the scroll bar to enter his decision, he can view his after-tax earnings (whether or not audited) for any possible level of income.

Figure 1: Sample Decision Screen

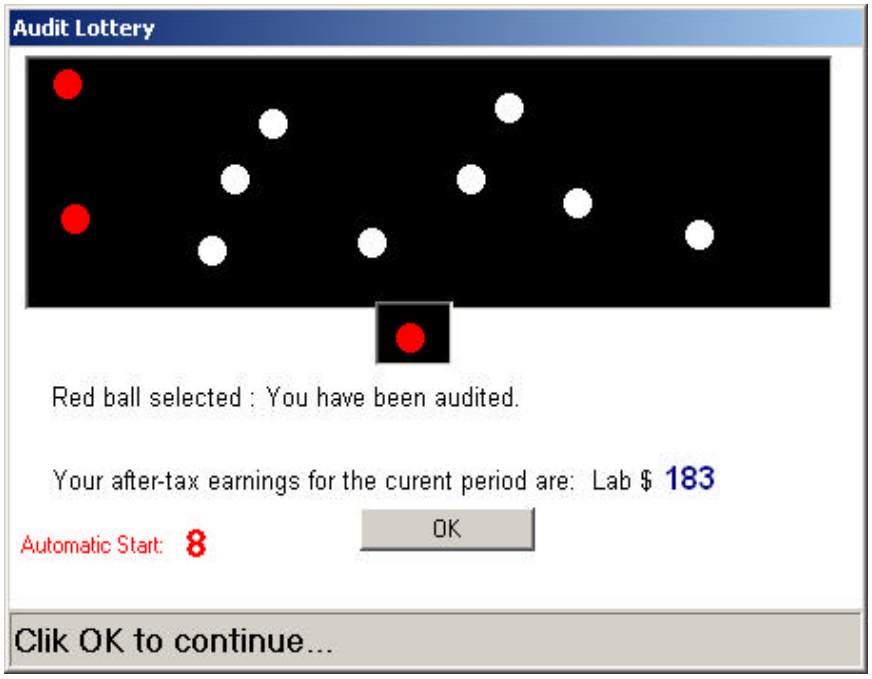


When a subject has entered his or her decision, he or she then clicks the "file taxes" button on the screen and waits to determine whether or not he or she was audited. While the subject waits, he or she sees a computerized bingo cage, where red balls mean the subject will be audited and white balls mean the subject will not be audited. Figure 2 shows a sample result screen for a subject who was audited. After viewing this information, the subject goes on to the next decisionmaking round. In all subsequent rounds, the subject can review all of his or her tax information (income, reported income, whether he or she was audited, and earnings) from any previous rounds by clicking on a "Tax History" button (as shown at the top-right part of Figure 1).

Before subjects started the experiment, they participated in three practice rounds, which had no impact on their earnings. These practice rounds served to familiarize subjects with the computer interface, the basic procedures of the experiment, and how earnings were calculated. After the three practice rounds, subjects were given the opportunity to ask questions, and the experiment (which lasted for 20 rounds) began.

We employ two treatments in this study: full confidentiality and partial confidentiality. In both treatments, decisions are made just as described above. Each subject makes his or her own decision privately, using the computerized

Figure 2. Sample Result Screen



interface. In order to maintain privacy, computer workstations are separated by privacy dividers to visually isolate the subjects, and no one is allowed to communicate with another subject during the experiment.

In the full confidentiality treatment, all decisions are kept private--no subject can observe the decisions made by any other subject. In the partial confidentiality treatment, some subjects are randomly chosen to view the reported tax information of other subjects. Subjects in these sessions were told:

> In each round, 2 (10 percent) of you will be shown the incomes reported by 25 percent of the subjects in this experiment. We have already randomly chosen which subjects will be able to view this information. After you have viewed your earnings information from the current round, those of you who have been chosen to view this information will be shown a table showing the levels of income reported by 4 people in this experiment. These people will see a three-digit ID code of a subject and the income reported by that subject. The viewers will not be told which ID code belongs to which subject in this room.

> In each round, 25 percent of your returns will be randomly chosen to be shown to these viewers. Therefore, the returns the viewers see in each round may be for different subjects. However, the same people will be able to view the returns in each round. In other words, if you do not view a return after Round 1, you will not view a return in any future round either.

In this treatment, subjects knew the probability that 25 percent of returns would be viewed in each round, but did not know whether their own returns were viewed in any given round. This reflects the naturally-occurring situation in which it is unlikely that an individual would know whether someone had viewed his or her return or not.[5]

The parameters used for these experiments are shown in the top rows of Table 1. Each subject had an income of 200 in each round. The tax rate used was 35 percent, the probability of being audited was 30 percent, and the penalty rate was 2. Subjects made decisions in 20 rounds. The income, tax rate, probability of being audited, penalty rate, and confidentiality treatment (full or partial) were identical for all 20 rounds of the experiment. At the end of the experiment, subjects were paid their total earnings, summed over all 20 rounds of the experiment. Subjects were told at the start of the experiment that all earnings would be converted to cash at a rate of $.01 for each dollar earned in the lab. So, 200 lab dollars corresponded to $2.00.

Table 1. Experiment Parameters

	Full Privacy	Partial Privacy
Income	200	200
Tax Rate	35%	35%
Probability of Being Audited	30%	30%
Penalty Rate	2	2
Number of Rounds	20	20
Percentage of Subjects who View Returns	0	10%
Percentage of Returns Viewed Each Round	0	25%
Number of Sessions	2	1
Number of Subjects	22	17

Notice that the only difference between the two treatments was in whether any tax information was viewed by other subjects. All other treatment variables were identical.

Subjects for these experiments are largely students from Georgia State University, recruited from undergraduate classes and by flyers posted in campus buildings. Some subjects had participated in other economics experiments, but none had any experience participating in a tax compliance experiment. Each subject in this experiment participated in only one experimental session, and therefore participated in just one of the confidentiality treatments.

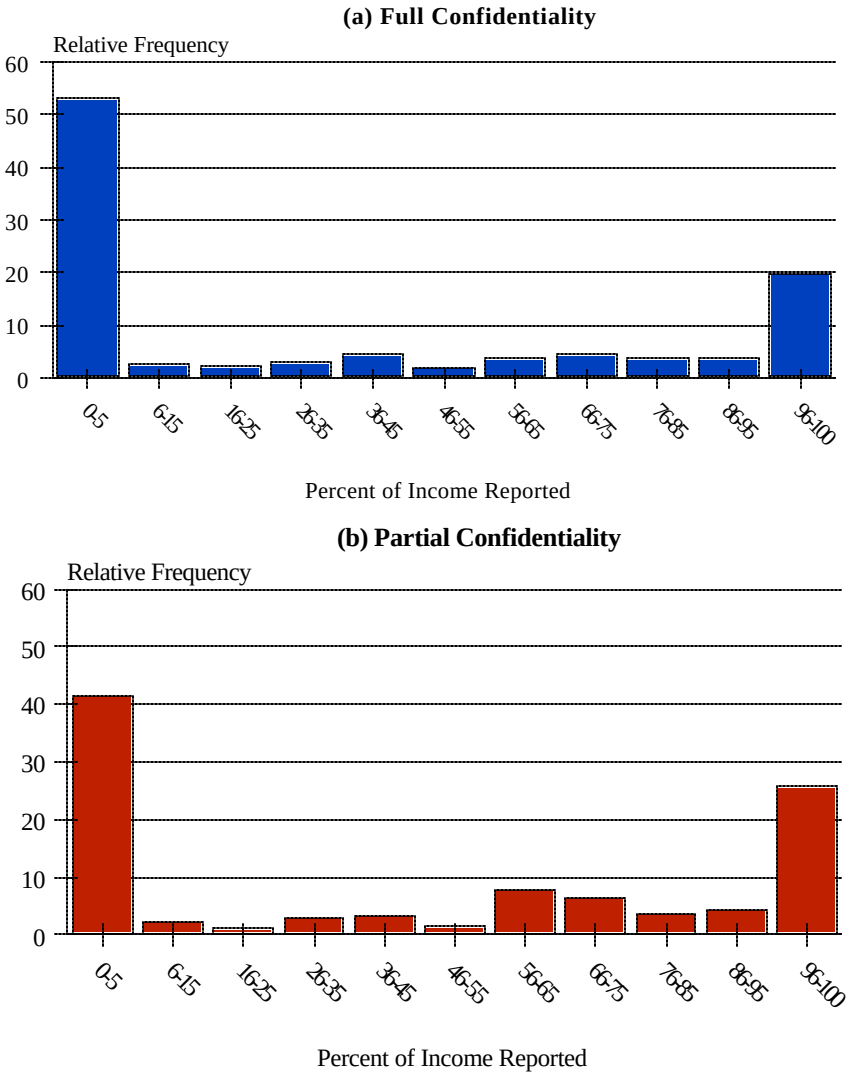
Preliminary Results

In this section, we present preliminary results from three experimental sessions: two conducted under the full confidentiality treatment (23 subjects total) and one conducted under the partial confidentiality treatment (17 subjects total). (See the bottom rows of Table 1). Sessions lasted at most 1 hour; average earnings were about the same between treatments ($29.55 in the full confidentiality sessions and $29.71 in the partial confidentiality session); however, there was a somewhat wider range of earnings in the full confidentiality sessions ($26.30 - $35.80) when compared to the partial confidentiality session ($26.00 - $32.60). More data are certainly needed in order to draw firm conclusions about the effects of confidentiality on tax compliance in a laboratory setting. However, in this section, we present preliminary results based on the two experimental sessions we have already conducted.

Figure 3 presents a frequency distribution of the income reported by each subject in a treatment in every round of the experiment. Because each individual reported income in 20 decisionmaking rounds, there are 20 observations for each individual in this figure. Data from the full confidentiality treatment are shown in Panel (a), and data from the partial confidentiality treatment are shown in Panel (b). Several aspects of the data are evident from Figure 3. First, the distribution of reported income is quite similar across treatments. A slightly higher proportion of subjects in the full confidentiality treatment report between 0 percent and 5 percent of their incomes than in the partial confidentiality treatment (52.8 percent, compared with 41.3 percent); similarly, a higher proportion report between 95 percent and 100 percent of their incomes in the partial confidentiality treatment (25.7 percent compared with 19.6 percent in the full confidentiality treatment). However, the general pattern of data is quite similar between treatments.

In both treatments, the most frequently-observed decisions are reporting no income or reporting income fully. The most frequently-observed outcome is reporting no income at all: in the full-confidentiality treatment, subjects report no income in 48 percent of decision rounds (39.7 percent in the partial-confidentiality treatment). However, reporting income fully is the second most-frequently observed outcome: in the full-confidentiality treatment,

Figure 3. Frequency Distribution of Reported Income



subjects report their full incomes in 18.3 percent of decision rounds (25.3 percent in the partial confidentiality treatment). In other words, subjects report no incomes or full incomes in about two-thirds of all decisionmaking rounds. These decisions are consistent with expected-utility theory, which predicts that a subject will either report no income or all income, depending on the expected return from reporting income and his or her attitude toward risk.

Given the parameters of this experiment (income = 200, a 35-percent tax rate, 30-percent probability of being audited, and a penalty rate of 2), we can calculate the expected earnings associated with either of these outcomes. If a subject reports his or her income fully, he or she pays (.35 x 200) = 70 in taxes, and earnings (200 – 70 = 130) are identical whether or not he or she is audited. If a subject reports no income and is not audited, he or she pays no taxes, and, therefore, earnings are 200. However, if an individual reports no income and is audited, he or she pays a penalty equal to twice the taxes owed (2 x 70 = 140); so, total earnings are 200 – 140 = 60. A risk-neutral individual will simply compare the expected payoff in this situation; because there is a 30-percent chance of being audited:

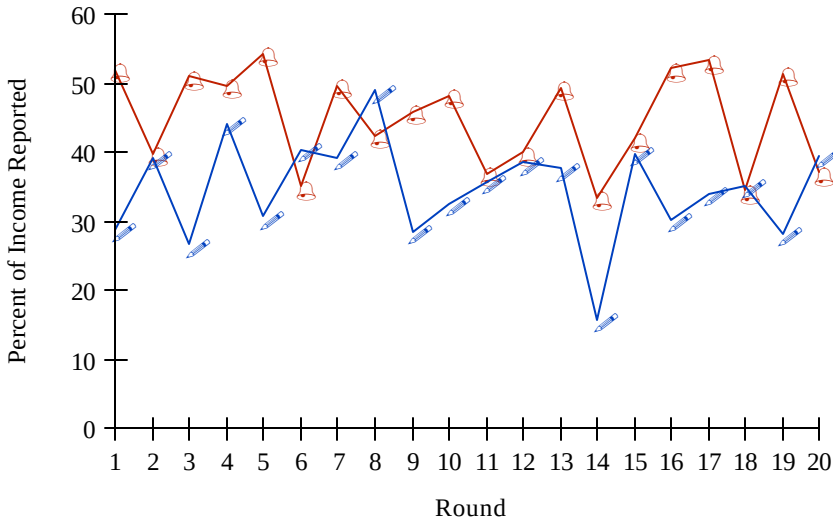
$$ExpectedEarnings = .3(60) + .7(200) = 158$$

Therefore, a risk-neutral person would prefer to report nothing, because the expected payoff from this (158) is higher than the sure payoff of reporting income fully (130). However, if one is risk-averse enough, one would prefer the sure outcome and report income fully.

Figure 4 presents the average percentage of income reported in each decisionmaking round. Despite the similarities seen in Figure 3, when the data are separated by decisionmaking round, larger differences in behavior are

Figure 4. Average Percentage of Income Reported

Full-Confidentiality Treatment (lower line) versus Partial-Confidentiality Treatment (higher line)



evident. In general, the level of reported income is higher in the partial confidentiality sessions, when subjects know that there is a 25-percent chance that others will view their reported incomes. Table 2 shows the average percentage of income reported in each round. The level of income reported is higher in the partial confidentiality sessions in 16 out of 20 rounds. However, sometimes, these differences are quite small. The final column of this table presents the p-value for a Wilcoxon test for the difference between these two treatments. The data in this column show that the difference between treatments is significant only in rounds 1, 3, 5, 9, and 19. Therefore, while reported income is typically higher under the partial-confidentiality treatment, this difference is not universally significant.

Table 2. Average Reported Income by Round

Round	Full Confidentiality	Partial Confidentiality	Wilcoxon p-value
1	28.74	51.97	.05
2	39.35	39.87	.38
3	26.63	50.97	.07
4	44.24	49.77	.32
5	30.67	54.33	.03
6	40.43	35.07	.38
7	39.20	49.67	.24
8	48.96	42.50	.33
9	28.59	45.90	.10
10	32.52	48.30	.14
11	35.72	37.00	.42
12	38.50	39.93	.49
13	37.61	49.43	.32
14	15.85	33.47	.24
15	39.83	42.00	.49
16	30.28	52.23	.11
17	33.98	53.33	.13
18	35.22	34.43	.46
19	28.20	51.47	.09
20	39.57	37.10	.42

One shortcoming of this simple, nonparametric approach to test for differences is that it fails to account for potentially important variables, such as differences in observed audit rates between treatments. In order to consider this more carefully, we estimate the following regression:

$$I_R = b_1 Round + b_2 Audit_{t-1} + b_3 Treatment$$

where $Audit_{t-1}$ represents whether the individual was audited in the previous period, and *Treatment* = 1 for the partial confidentiality treatment. Table 3 presents basic OLS estimates of this model. These results show that including whether one was audited in the previous round is important: reported

Table 3. OLS Estimates

	Coefficient	Standard Error	p-value
Round	-0.55	0.58	.34
$Audit_{t-1}$	-19.83	7.03	.01
Treatment	82.12	12.93	.00

income is significantly lower (by about $20) in the round after one is audited. After controlling for this variable, the data show that reported income is significantly higher under the partial confidentiality treatment, when compared with the full confidentiality treatment.

We also tested for the significance of the treatment (confidentiality) in an expanded regression model that includes a series of demographic variables in a random effects model. These results are reported in Table 4. As seen there, the treatment variable is still positive, but much smaller than in the case of the limited OLS regression, and the coefficient is of lower significance. A number of the demographic variables seem to be quite important in explaining reporting behavior. Single filers are likely to report less income; those with more economics courses are also likely to report less income; but business and economics majors are likely to report more income as are women and those raised in North America.

As noted above, these results are obtained with relatively sparse data. However, they provide intriguing evidence that the perceived confidentiality of one's tax information may have a significant effect on compliance. The results of Table 4 suggest that there may be additional interactions to exploit, and we plan to analyze these interactions in future research.

Table 4. Random Effects Estimates, Expanded Model

	Coefficient	Standard Error	p-value
Round	-0.453	0.46	.33
$Audit_{t-1}$	-14.51	5.59	.009
Treatment	21.00	15.74	.182
Age of subject	-2.43	3.12	.437
Gender (1=males, 2=females)	29.98	16.65	.072
Race white (=1 for white, 0 other)	-33.03	26.77	.217
Race black (=1 for black, 0 other)	13.24	22.69	.559
Raised in North America	74.66	26.50	.005
Marital Status (=1 married, =2 single)	-76.27	28.64	.008
Business/econ major (=1 if yes, =0 other)	43.74	19.81	.027
Graduate student (=1 if yes, =0 other)	47.88	34.54	.166
Number of economics courses taken	-6.71	4.44	.131

Conclusions, Caveats, and Future Research

In this paper, we use experimental methods to test for the relationship between confidentiality and tax compliance and find some preliminary evidence that a loss of confidentiality increases compliance. Theoretically, there is reason to believe that a reduction in confidentiality could lead to more or less

compliance. In the lab, we attempt to mimic the reporting situation faced by the taxpayer by having subjects make the decision over the level of reporting, given a tax rate, penalty structure, and audit probability. As there are many concepts of confidentiality and breaches, it is difficult to develop a treatment that mimics an exact concept of confidentiality in the lab. Our use of the "disclosure" of tax reporting to other subjects may be a reasonable way to mimic our variable of interest—that of the perception of a loss of confidentiality. However, in real life, the impact of a breach may be different depending on past behavior (have you cheated for a long time?), or on how much you have to lose (are you a public member of society?). In future experiments, we hope to control for some of these complications and will also likely test for responses when audit and/or penalty rates differ.

Another issue related to this research is whether or not there is a more appropriate theoretical model that could shed more light on the expected results of changes in confidentiality on compliance. As noted earlier, there are some alternatives to the expected utility model, which may more realistically encompass the perceptions of individuals.

Finally, we also plan to alter the confidentiality component by showing pictures of those individuals who "cheat" to either designated individuals chosen to "see" the tax returns and/or showing these pictures to all subjects. The latter treatment has more of the flavor of affecting compliance via a shaming mechanism, which may not be comparable to the disclosure issue as presented above.

Endnotes

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[1] For example, use of third-party tax filers (including paid preparers and various online filing services) may affect at least the perception of confidentiality of data. For Tax Year 2004, the IRS posted a number of e-filing partners, whom the taxpayer could choose to use to e-file. The issue of privacy and disclosure is noted on Intuit's Web site: "We have limited relationships with third parties to assist us in servicing you, for example, by fulfilling customer orders or providing customer service.

These service providers are contractually required to maintain the confidentiality of the information we provide them. Additionally, we have business partners who provide services, some of which are cobranded. We clearly identify partner services and sites. When you request any of these products or services, you are permitting us to provide your personal information to the partner to fulfill your request. We may disclose your information if we are required to by a law enforcement action, such as a court order, subpoena, or search warrant" (http://www.turbotax.com/privacy.html?ttid=ttfooter).

[2] A related impact of reduced confidentiality is that, if noncompliance taxpayer data are made public, a contagion effect could reduce compliance of others in the "if he didn't comply, why should I" syndrome.

[3] Some might argue that the last two compliance issues are one and the same. However, we could differentiate between individuals who work in jobs for which there is reporting by the employer to the IRS and simply refuse to file a tax return and those who choose not to participate in the system at all by accepting jobs with payments "under the table."

[4] In fact, there is evidence that the perceived probability is overstated (Alm, 1991).

[5] This is as if taxpayers were told that their tax return information may be shared among agencies or between Federal and State governments, but received no feedback regarding whether or not such disclosure actually occurred.

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